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Original Article

Spinal Anaesthesia and Perioperative Anxiety

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Abstract

Objective: Anxiety is a pathological condition with a feeling of fear accompanied by somatic symptoms due to hyperactivity of the autonomic nervous system. In this study, we aimed to compare perioperative anxiety status and the effects of age, gender, educational status, and The American Society of Anesthesiologists physical status classification (ASA) score on perioperative anxiety in patients undergoing elective surgery under spinal anaesthesia.

Methods: After IRB approval and signed informed consent, 100 healthy patients undergoing elective surgery under spinal anaesthesia were enrolled. The demographic data of patients and ASA scores were recorded. After spinal anaesthesia, State Trait Anxiety Inventory (STAI) and anxiety levels were measured.

Results: The mean anxiety score in patients undergoing surgery under spinal anaesthesia indicate the presence of an intermediate level of anxiety (44.58±19.06). A statistically significant positive correlation was found between anxiety scores and age of patients with increased age ($p<0.01$). Statistically significant differences were found between anxiety scores of patients according to gender, and women's anxiety scores were found to be significantly higher than in men ($p<0.05$). Anxiety scores did not differ significantly between education levels. A statistically significant difference was found between anxiety scores regarding ASA scores ($p<0.05$). Evaluation of patients revealed that the anxiety score of patients with ASA score 1 was significantly higher than the anxiety score of patients with ASA score 2. There was no significant difference between anxiety score of patients with ASA scores 2 and 3.

Conclusion: There is a mid-level anxiety, associated more with advanced age, female gender, and low ASA score, in patients undergoing elective surgery under spinal anaesthesia.

Key Words: Anaesthesia, spinal, anxiety

Introduction

Anxiety is a pathological condition characterized by a sense of fear that accompanies somatic symptoms resulting from hyperactivity of the autonomic nervous system. Prevalence of anxiety symptoms is reported to be 10-30% in patients treated for any reason at a hospital (1). Preoperative anxiety is encountered at a rate of 60-80% in patients scheduled for surgery, and influences surgery, anaesthesia and consequently postoperative healing unfavourably (2, 3). In fact, 5% of general surgery patients have such severe anxiety symptoms that they refuse the treatment applied (4). Anxiety may enhance the need for anaesthetics and the risk of "awareness" during surgery while leading to pathophysiological responses such as hypertension and rhythm disorders in such patients (5-8).

It has been reported that higher number of medical complications develop and postoperative hospital stay is prolonged in patients with a high level of preoperative anxiety (9, 10). This indicates that anxiety treatment needs to be an inseparable part of surgical treatment. Reducing stress and anxiety during elective surgery would reduce organ dysfunctions and complications by decreasing the neurohormonal response to surgery (11). Many studies in the literature aimed to evaluate hospital anxiety, as well as preoperative and postoperative anxiety for surgery patients, but perioperative anxiety has not been discussed enough (12-14).

The present study investigated the effects of age, gender, education status, and American Society of Anesthesiologists (ASA) class on perioperative anxiety in patients undergoing elective surgery under spinal anaesthesia.

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Methods

After the approval of the Ministry of Health Okmeydanı Training and Research Hospital Ethics Committee dated 10.10.2012 and number 02 and the informed consents of the patients were obtained, the study was performed on patients, scheduled for elective surgery under spinal anaesthesia. A hundred patients aged between 18 and 87 years and had an ASA score between I and III, were enrolled in the study. Patients who were unable to speak and read in Turkish, those with visual or hearing problems, psychiatric diseases, hepatorenal diseases, obesity (BMI >38 kg m^{2-1}), serious organ dysfunction, atrioventricular (AV) block and myasthenia gravis, and, those receiving psychiatric medications, hypnotics, opioids analgesics, calcium channel blockers or anticoagulants were excluded from the study. In addition, patients who were pregnant, those who were allergic to local anaesthetic medications and patients in whom regional anaesthesia was contraindicated were also not included.

All patients received an intravenous infusion of 10 mL kg^{-1} lactated Ringers' solution before surgery. Intraoperative monitoring included pulse oximetry, non-invasive blood pressure measurement and electrocardiogram.

Lumbar puncture was performed using a 22 gauge atraumatic spinal needle (Spinocan® Braun Melsungen AG) and 12.5 mg of 0.5% hyperbaric bupivacaine (Marcaine® Spinal Heavy 0.5%, AstraZeneca). The subarachnoid space was entered by the spinal needle through L3-L4 lumbar level in the midline. After aspiration of the cerebrospinal fluid, hyperbaric bupivacaine was injected into the subarachnoid space in 15 seconds; but, barbotage was not performed. After the spinal needle was withdrawn, the patient was placed in supine position with the head at an angle of 15°-20°. After sensory block, defined as the absence of pain at T10 dermatome, was induced by needle-tip test by the anaesthesiologist, the surgery was initiated. Additional analgesic drugs were not performed unless the patient requested. Haemodynamic monitoring, including systolic and diastolic blood pressure (SBP, DBP), heart rate (HR) and level of conscious, was performed at 5-minute intervals in the first 30 minutes and at 15-minute intervals thereafter. Motor block was assessed by modified Bromage scale (0: no motor movement, 1: inability to flex hip, 2: inability to flex knee, 3: inability to flex ankle). The patient was transferred to the recovery room when complete resolution of motor block was achieved and if the patient had no pain, nausea or vomiting.

Anxiety levels of the participants were assessed prior to surgery after spinal anaesthesia using 20-item "Trait Anxiety Inventory" of "State-Trait Anxiety Inventory-STAI" (Table 1) (15, 16). Among the following options, the participants were asked to rate the extent to which they believe the statements best describes their current mood "not at all, somewhat, moderately so, very much so" options. While the items No. 3, 4, 6, 7, 9, 12, 13, 14, 17 and 18 were positively rated, negative points were given for the items No. 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20. Scoring was performed manually. During scoring, points were given between 1 and -1 or 4 and -4 according to the positive or negative characteristics of the item, and an extra 50 points was added to the total score. The maximum and minimum scores were considered to be 80 and 20, respectively. After the Trait Anxiety Inventory was completed, IV midazolam (0.02-0.03 mg kg^{-1}) was administered for sedation.

Table 1. STAI Form TX-I

	Not at all	Somewhat	Moderately so	Very much so
1. I feel calm	(1)	(2)	(3)	(4)
2. I feel secure	(1)	(2)	(3)	(4)
3. I am tense	(1)	(2)	(3)	(4)
4. I am regretful	(1)	(2)	(3)	(4)
5. I feel at ease	(1)	(2)	(3)	(4)
6. I feel upset	(1)	(2)	(3)	(4)
7. I am worrying over possible misfortunes	(1)	(2)	(3)	(4)
8. I feel rested	(1)	(2)	(3)	(4)
9. I feel anxious	(1)	(2)	(3)	(4)
10. I feel comfortable	(1)	(2)	(3)	(4)
11. I feel self-confident	(1)	(2)	(3)	(4)
12. I feel nervous	(1)	(2)	(3)	(4)
13. I am jittery	(1)	(2)	(3)	(4)
14. I feel "high strung"	(1)	(2)	(3)	(4)
15. I feel relaxed	(1)	(2)	(3)	(4)
16. I feel satisfied	(1)	(2)	(3)	(4)
17. I am worried	(1)	(2)	(3)	(4)
18. I feel over-excited and rattled	(1)	(2)	(3)	(4)
19. I am joyful	(1)	(2)	(3)	(4)
20. I am pleasant	(1)	(2)	(3)	(4)

According to the power analysis performed based on current relevant literature information, a sample size of at least 82 subjects were found to be sufficient in order that statistical significance for the prevalence of preoperative anxiety can be evaluated between the groups over at least 20% difference, 5% error and 80% power.

Statistical analysis

Number Cruncher Statistical System (NCSS) 2007&Power Analysis and Sample Size (PASS) 2008 Statistical Software (Utah, USA) program was used for statistical analysis. Besides descriptive statistical methods (Mean, Standard Deviation, Median, Frequency, Ratio), Student-t test was used for the comparison of normally distributed quantitative data between two groups and One-way Anova test was used for the

comparisons between three or more groups. Kruskal Wallis test and Mann-Whitney U test with Bonferroni correction as post hoc test were used to evaluate the anxiety scores according to ASA classes. Relation between the parameters was evaluated by Pearson's Correlation analysis. Statistical significance was evaluated at $p<0.05$ and $p<0.01$.

Results

The present study was carried out with 100 cases between November 2012 and February 2013. The ages of the cases ranged between 18 and 87 years, with a mean age of 42.48±18.68 years. Of the study participants, 30% (n=30) were female and 70% (n=70) were male. Anxiety scores of the participants ranged between 34 and 77, with a mean score of 44.58±6.19 (Figure 1). ASA class was I in 62% (n=62), II in 32% (n=32) and III in 6% (n=6) of the cases. Whilst 8% (n=8) of the cases were literate, 38% (n=38) were primary school graduates, 16% (n=16) were middle school graduates, 26% (n=26) were high school graduates and 12% (n=12) were university graduates (Table 2).

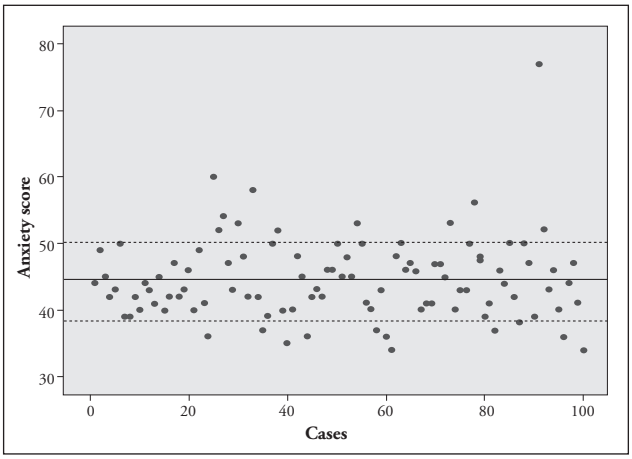

Figure 1. Distribution of the cases according to anxiety scores

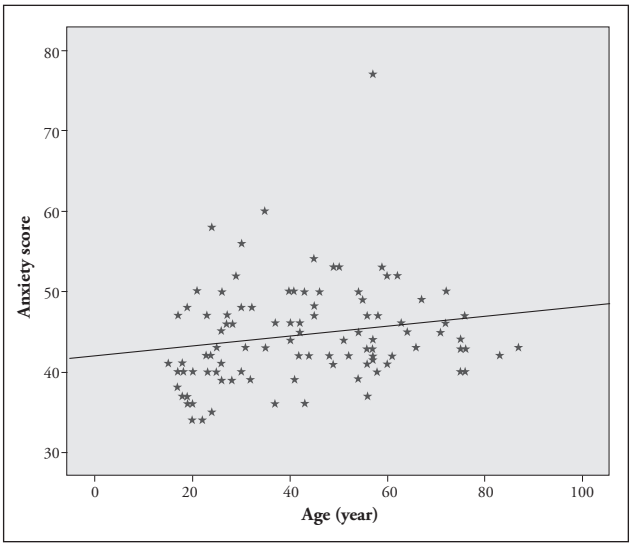

Figure 2. The relation between anxiety scores and age

A positive and statistically significant correlation was determined between anxiety scores and patient ages ($r=0.260$, $p<0.01$). It was observed that anxiety scores increased with advanced age (Table 3, Figure 2). Anxiety scores showed a significant difference according to gender ($p<0.05$); anxiety scores of females were significantly higher than that of males (Table 4, Figure 3). Anxiety scores did not significantly differ according to education status. There was a statistically significant difference between anxiety scores according to ASA classes ($p<0.05$). Analysis performed to identify the group that caused the significant difference revealed that anxiety scores of ASA I patients were significantly higher than that of ASA II patients ($p=0.027$, $p<0.05$). No significant difference was determined between ASA I and ASA III groups and between ASA II and ASA III groups in terms of anxiety scores (Table 5, Figure 4).

Discussion

In the recent years, anxiety has been started to be used as a quality index in hospitals and it has been demonstrated that preoperative anxiety influences patient satisfaction and prolongs hospital stay (17, 18).

It is known that concerns about anaesthesia and surgery in the preoperative period lead to anxiety. Even though, not life-threatening, there is also high perioperative anxiety and stress. This may result from numerous conditions; in addi-

Table 2. Distribution of demographic characteristics of the patients

		Min-Max	Mean±SD
Age (years)		15-87	42.48±18.68
ASA class		I-III	1.44-0.61
Anxiety Score		34-77	44.58±6.19
		n	**%**
Gender	Female	30	30.0
	Male	70	70.0
ASA Score	I	62	
	II	32	
	III	6	
Education Level	Literate	8	8.0
	Primary school	38	38.0
	Middle school	16	16.0
	High school	26	26.0
	University	12	12.0

ASA: American Society of Anaesthesiologists Physical Status Classification; Min: minimum; Max: maximum; Mean±SD: mean±standard deviation

Table 3. Relation between age and anxiety scores

	Age-Anxiety score
R	0.260
P	0.009

r=Pearson's correlation coefficient, **p<0.01

Figure 3. Distribution of anxiety scores according to gender
Mean±SD: mean±standard deviation

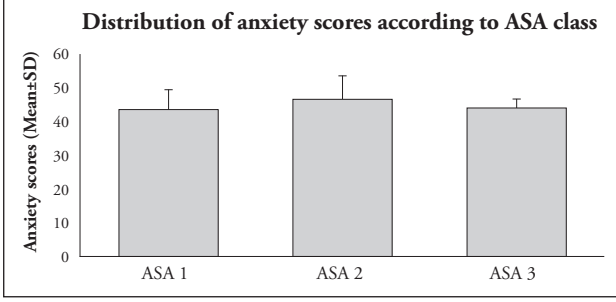

Figure 4. Distribution of anxiety scores according to ASA class
ASA: American Society of Anaesthesiologists Physical Status Classification; Mean±SD: mean±standard deviation

Table 4. Anxiety scores according to gender and education status

		Anxiety Score		
		Mean	SD	p
Gender	Female (n=30)	46.87	5.01	[a]0.015*
	Male (n=70)	43.60	7.85	
Education	Primary school and lower education level (n=46)	45.38	5.95	[b]0.206
	Middle school (n=16)	45.38	5.95	
	High school (n=26)	43.19	3.60	
	University (n=12)	42.33	6.33	

[a]Student-t test; [b]Oneway Anova test; SD: standard deviation; *p<0.05

Table 5. Anxiety scores according to ASA class

		Anxiety Score			
		Mean	SD	Median	p
ASA	1 (n=62)	43.60	5.85	42.50	
	2 (n=32)	46.59	6.92	45.00	[b]0.041*
	3 (n=6)	44.00	2.68	43.00	

ASA: American Society of Anaesthesiologists Physical Status Classification; SD: standard deviation; [b]Kruskal Wallis test; *p<0.05

tion to concerns such as being apart from home and relatives and interruption of daily activities, there are also concerns about likely complications during or after surgery, not having adequate information about anaesthesia and surgery, anxiety about not waking after surgery, as well as about pain during and after surgery. Disability that the physical disease brings along, despair, concern about the loss of ability, concern about the probability of injury of body organs or parts, fear of death, and the meaning attributed to the disease influence the severity of anxiety that the individual experiences (19-21).

Some patients are afraid that they will experience because of inadequate anaesthesia (9). Similar anxiety is present in patients undergoing elective surgery under spinal anaesthesia. In the present study, it was determined that there is a moderate level of preoperative anxiety in such patients and perioperative anxiety is much more associated with female gender, advanced age and low ASA class.

While a STAI-S cut-off of 39-40 is used for clinically significant symptoms, the cut-off for preoperative patients is determined to be 44-45. The reason for this is the fact that STAI-S indicates how an individual feels him/herself regardless of the situation or condition he/she is in (22, 23). In the present study, the mean perioperative STAI-S score was found to be 44.58±6.19. This result obtained in the present study, which consisted of females by 30% and males by 70%, is consistent with the literature (22). Many studies have reported that anxiety levels are higher in females as compared to males (24-26). Badner et al. (17) attributed this difference to separation from family in females, whereas Shevde et al. (27) and Domar et al. (25) propounded the reason that females could express their anxiety more easily than males. Higher anxiety scores obtained in females in comparison to males is not only from females' easily expressing themselves, but also from males' tendency to hide their anxiety because of social dynamics.

While some studies reported that anxiety level increased with increased education level, some studies demonstrated that education status did not have an effect on the degree of anxiety (25, 28-30).

It has been demonstrated that patient's anxiety is minimized in well prepared patients in the preoperative period and in conditions where patient safety is provided, and the patient is explained the surgery in the way that he/she can understand even it is impossible for the patient to understand because of age and mental capacity (31). In the present study, no statistically significant relation was found between education level and anxiety. Although the level of anxiety was the highest in primary school graduates and the lowest in university graduates, the difference was not statistically significant.

Clinical trials have determined that ASA class is determinative for preoperative anxiety (3, 16). In the present study, a statistically significant difference was determined in the anxiety scores of patients in different ASA classes. Anxiety scores of patients in ASA I class were found to be higher as

compared to those in ASA II group. However, no significant difference was found between ASA II group and ASA III group in terms of anxiety scores.

A well-coordinated postoperative and/or perioperative pain treatment with the appropriate surgical procedure enhances patient satisfaction and favourably influences long-term clinical outcomes. Duration of hospital stay is shortened and treatment cost is decreased (32). There are publications defending or opposing the presence of a correlation between increased age and anxiety score in surgery patients (33). Age and preoperative anxiety levels of the patients are associated with postoperative pain (34). In the present study, a positive statistically significant correlation was found between anxiety scores and patient ages. It was observed that anxiety scores increased with advanced age.

Conclusion

Anxiety is a pathological condition that delays patient healing and decreases patient satisfaction. A moderate level of anxiety, which is more associated with advanced age, female gender and low ASA class, is present in the patients that underwent elective surgery under spinal anaesthesia. Considering that an unfavourable anaesthesia and surgery experience would negatively affect the postoperative quality of life and would put pressure on the patient for probable subsequent surgeries, anaesthesiologists should pay attention to perioperative anxiety management in spinal anaesthesia, frequently being used in surgical procedures currently.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Ministry of Health Okmeydanı Training and Research Hospital.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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